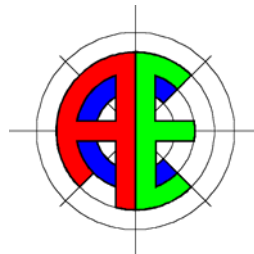


Melbourne City
Council

Overshadowing & Shading Images of MCC

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design advice

passive systems

design analysis

low energy services

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1 EXECUTIVE SUMMARY

This report presents the results in a visual format of a shadowing analysis on the proposed Melbourne City Council redevelopment.

A model of the development was built in Radiance and the shading and overshadowing aspects simulated under three different seasonal scenarios. The effectiveness of the modelled shading elements, as well as the overshadowing provided by the surrounding buildings, can be seen in the images provided.

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2 INTRODUCTION

This report has been carried out by Advanced Environmental Concepts for the City of Melbourne as part of the design for the new Melbourne City Council offices.

It summarises an overshadowing study carried out of the proposed façades for the proposed Melbourne City Council offices.

The aim of this report is to show the overshadowing from surrounding buildings and identify any areas of the façade which may require additional shading. This has been done by providing simulated images of the sun exposure on each façade at varying times of the year and day.

3 THE MODEL

The model of the building was built based on drawings provided by designinc in a program called Radiance. Radiance is global luminosity modelling software used to simulate both natural and artificial light sources. It generates simulated images showing the amount of light reflected off and falling on all surfaces within the image.

The model, as it has been simulated, may be slightly different to the current design and as such details have been provided below of the relevant shading elements and overshadowing considerations for clarification

3.1 Eastern Façade

The eastern façade is dominated by the stair core to the north and toilet core in the centre. The only shading element is to the south in the form of the balconies. These have been modelled as being 2.4 metres in width; and being situated on every floor, have a distance of 3.6 metres between them.

3.2 Western Façade

The western façade exhibits the operable louvres that cover most of that façade as can be seen from the images.

3.3 Northern Façade

The northern façade is shaded by a horizontal light shelf. This shading element extends 1.6 metres directly outwards from the building and is situated 2.2 metres above the floor level. The element is continuous on each floor and thus stretches the length of the floor.

3.4 Southern Façade

The southern façade has vertical shading elements only. The position of these elements varies for each level, in line with the air ducts. The elements each extend 0.8 metres directly outwards.

3.5 Roof

The roof in the model is simply at the height of the ninth floor ceiling, which is a height of RL49.15. It is understood that a two-storey plant room on the roof is to be added. This plant room would experience reduced shading from the surrounding buildings as their height increases relative to the surrounds. Thus the installation of solar or PV cells should not be decided solely upon the images given.

4 THE SEASONS

Three seasonal scenarios were used in the simulations to illustrate the range of shading and overshadowing that would be provided to the current building. The seasonal scenarios used were:

- Summer solstice (22nd December)
- Winter solstice (22nd June)
- Spring equinox (21st September)

The summer solstice is the longest day of the year and is the time during the year at which the sun's angle is at its highest. Conversely, the winter solstice is the shortest day of the year and is when the sun's angle is at its lowest point. The shading results at these two extremities thus represent the extremities of the shading provided to the building for the whole year. The spring equinox is a midpoint between the solstices and is provided to give an example of shading on a typical spring or autumn day.

5 THE RESULTS

Four elevation views were obtained from the model, each directly looking at one of the four façades. A fifth view, an aerial view of the roof, was obtained also. A snapshot of each façade view was then taken every fifteen minutes, starting and ending at varying times, depending on the season in question.

These images were then collated into animated gifs for each date and façade to show a simulated shading of the façade over the course of the day.

Each individual image has also been provided on a separate CD. Due to the vast quantity of images, only thumbnails have been provided here in Appendices A, B and C.

6 CONCLUSION

This report delivers the results in a visual format of a shadowing analysis on the proposed Melbourne City Council redevelopment.

A model of the development was built in Radiance and the shading and overshadowing aspects simulated under three different seasonal scenarios. The effectiveness of the modelled shading elements, as well as the overshadowing provided by the surrounding buildings, can be seen in the images provided.

APPENDIX A – WINTER SHADING

Winter: Eastern Facade



Figure 1 - winter: eastern facade 7am - 12:45pm

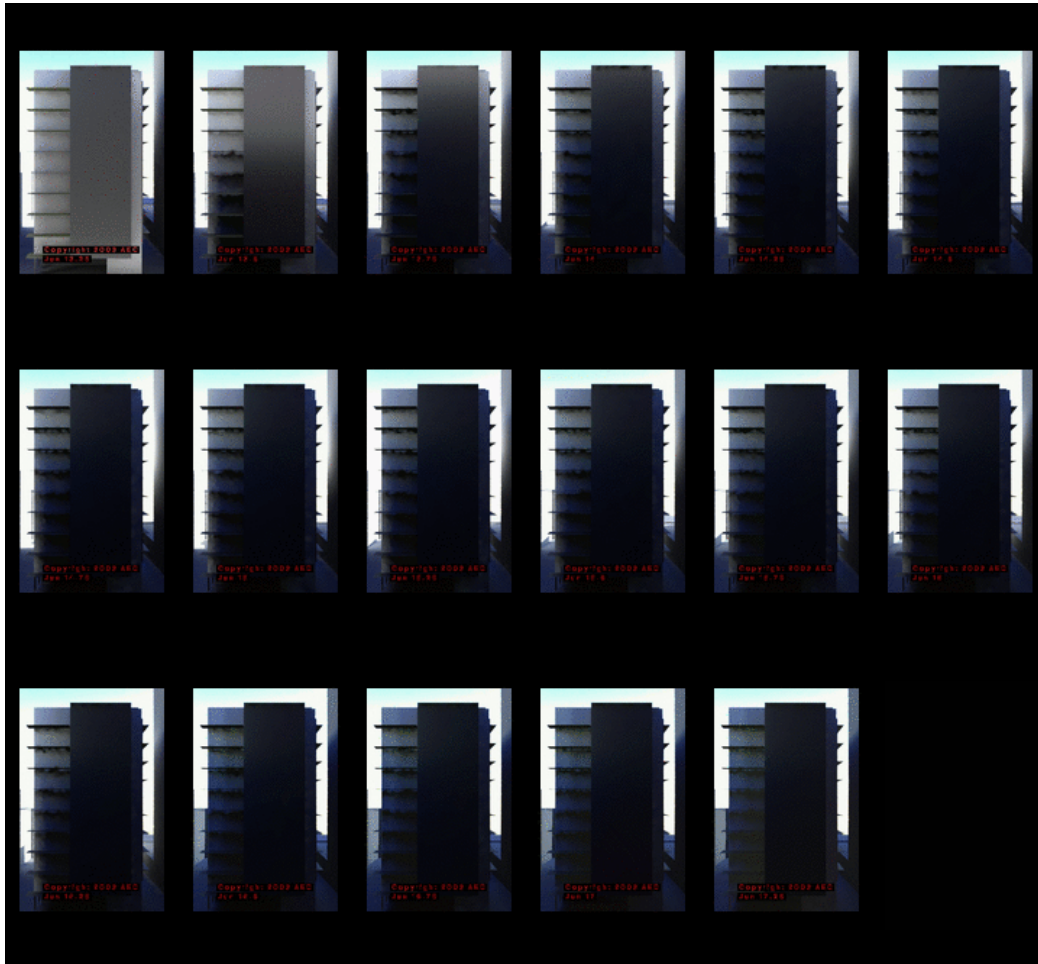


Figure 2 - winter: eastern facade 1pm – 5:30pm

Winter: Western Facade

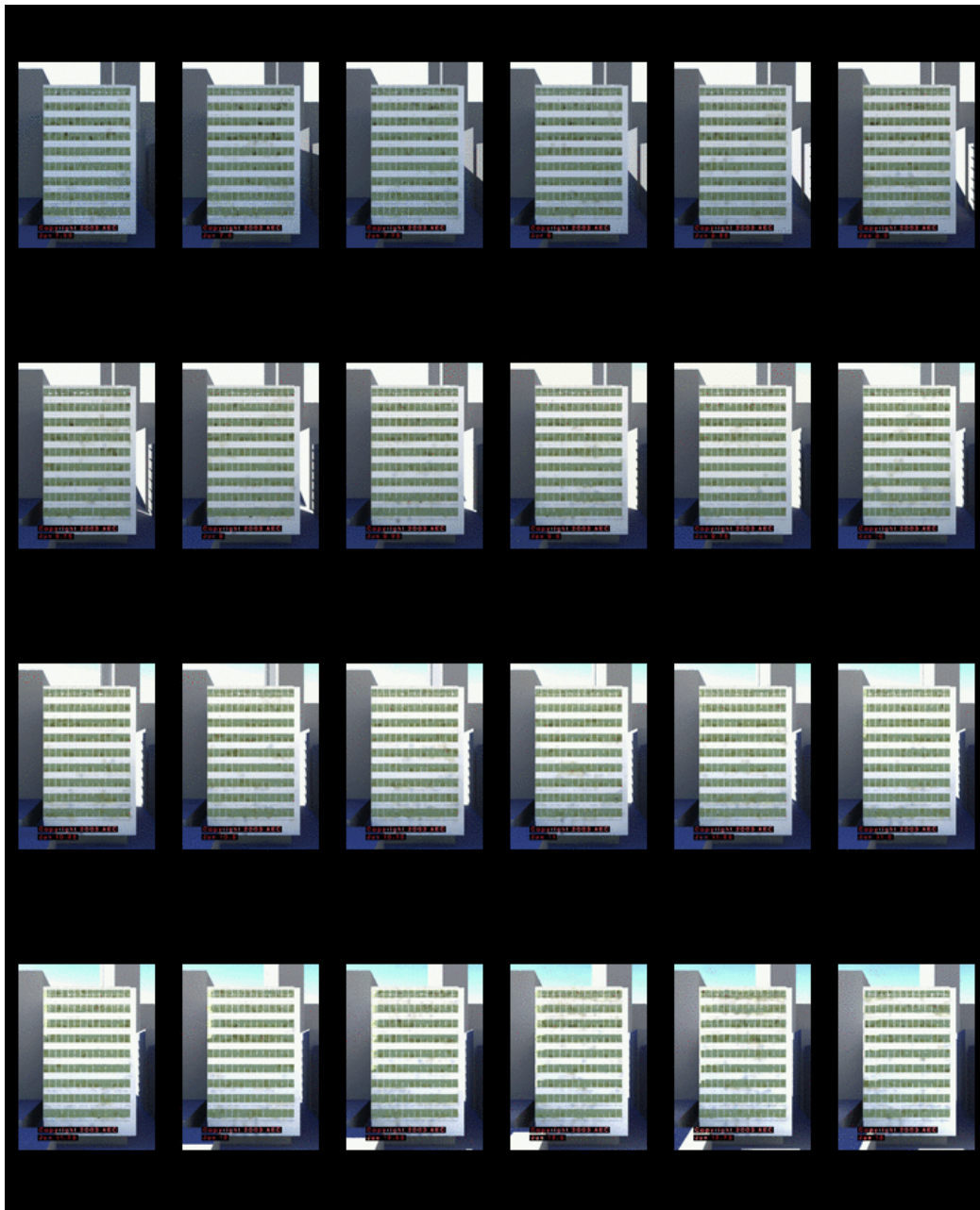


Figure 3 - winter: western facade 7am - 12:45pm

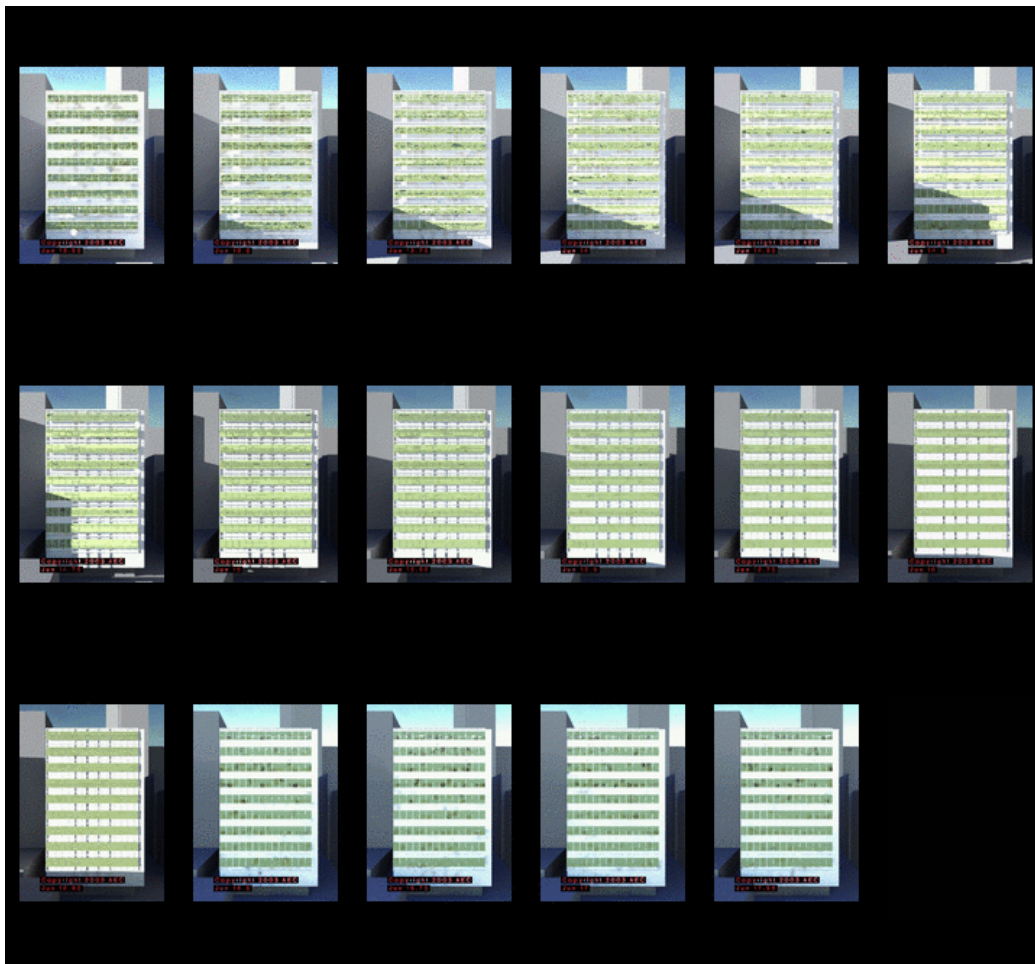


Figure 4 - winter: western facade 1pm – 5:30pm

Winter: Northern Façade



Figure 5 - winter: northern facade 7am - 12:45pm

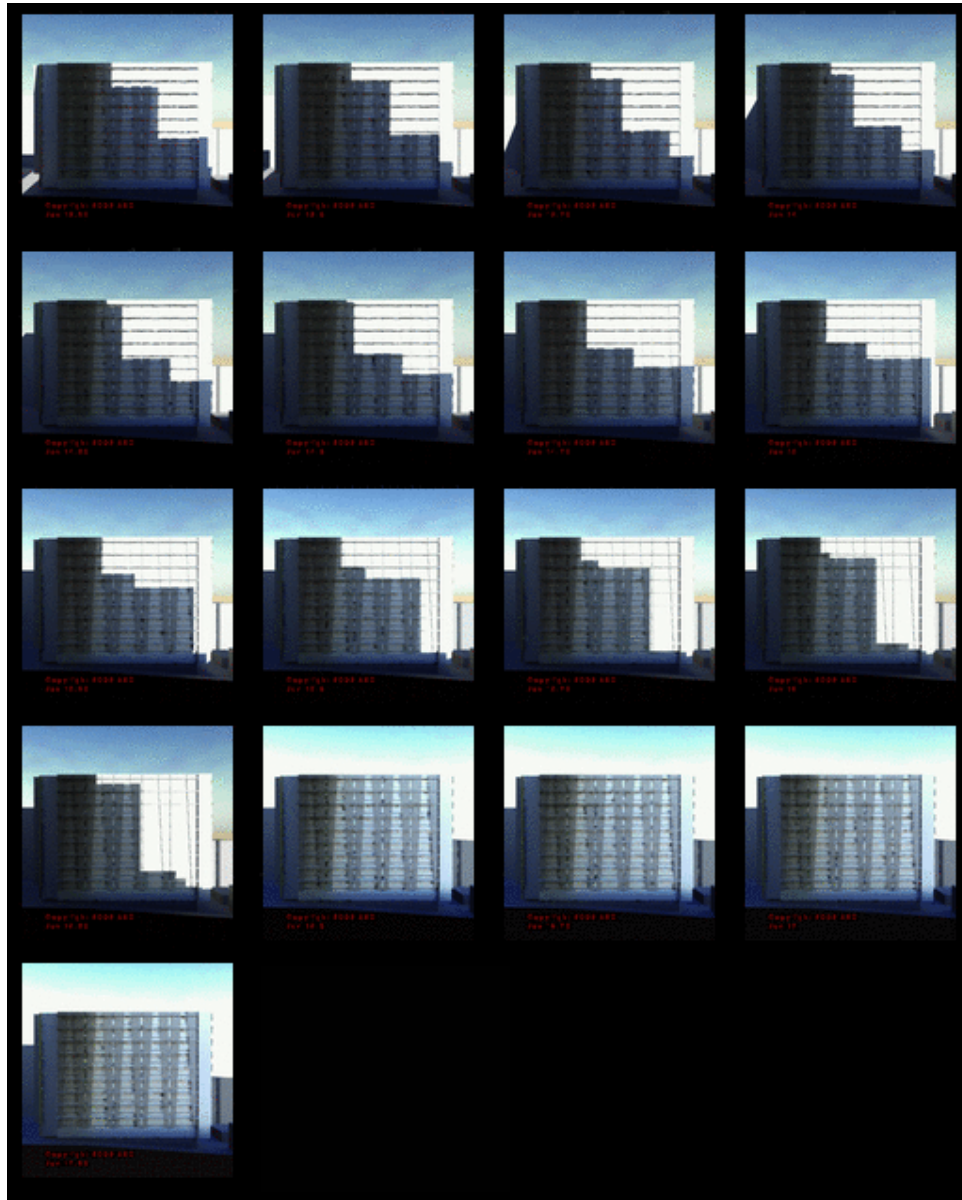


Figure 6 - winter: northern facade 1pm – 5:30pm

Winter: Southern Façade

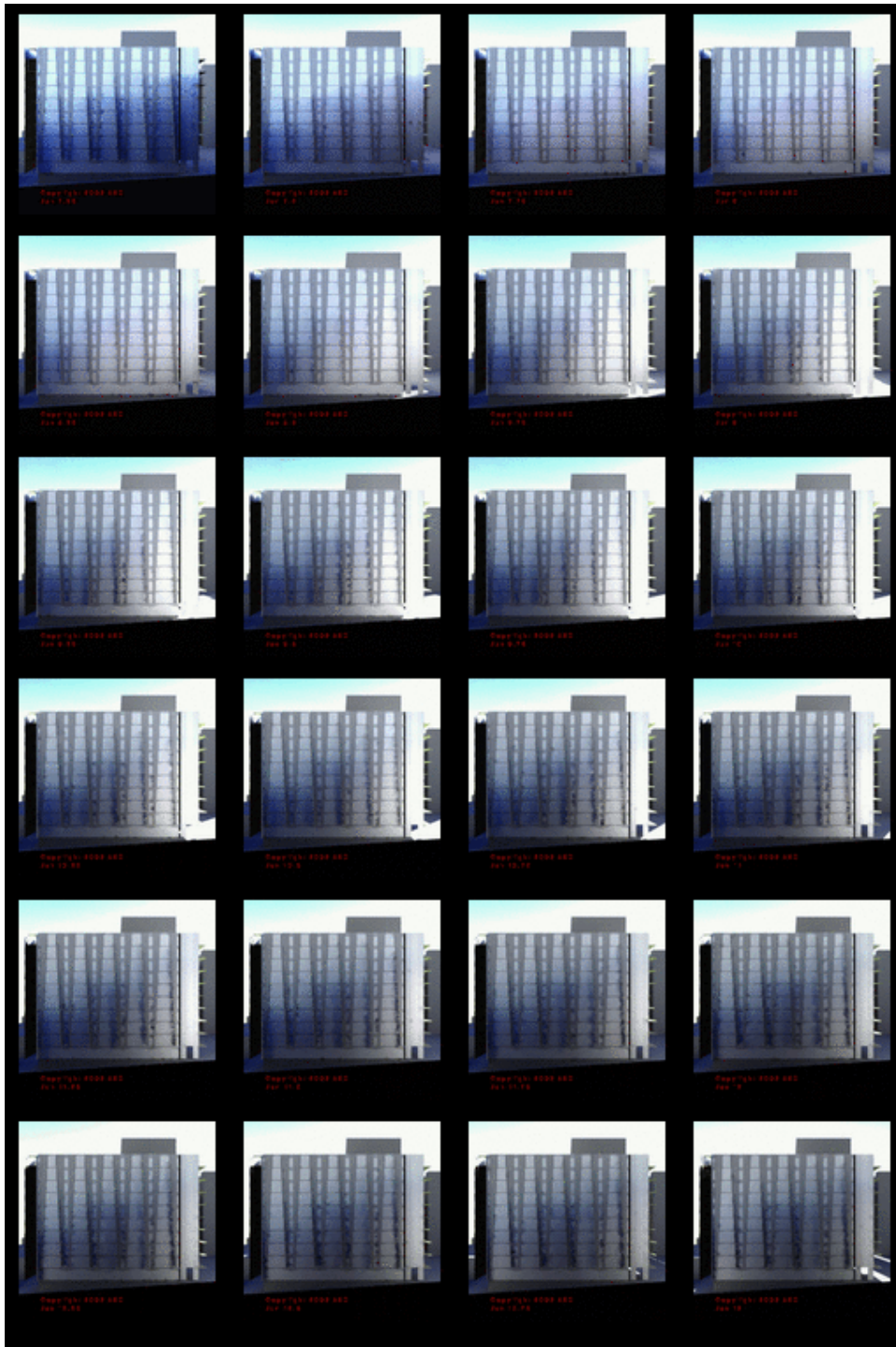


Figure 7 - winter: southern facade 7am - 12:45pm

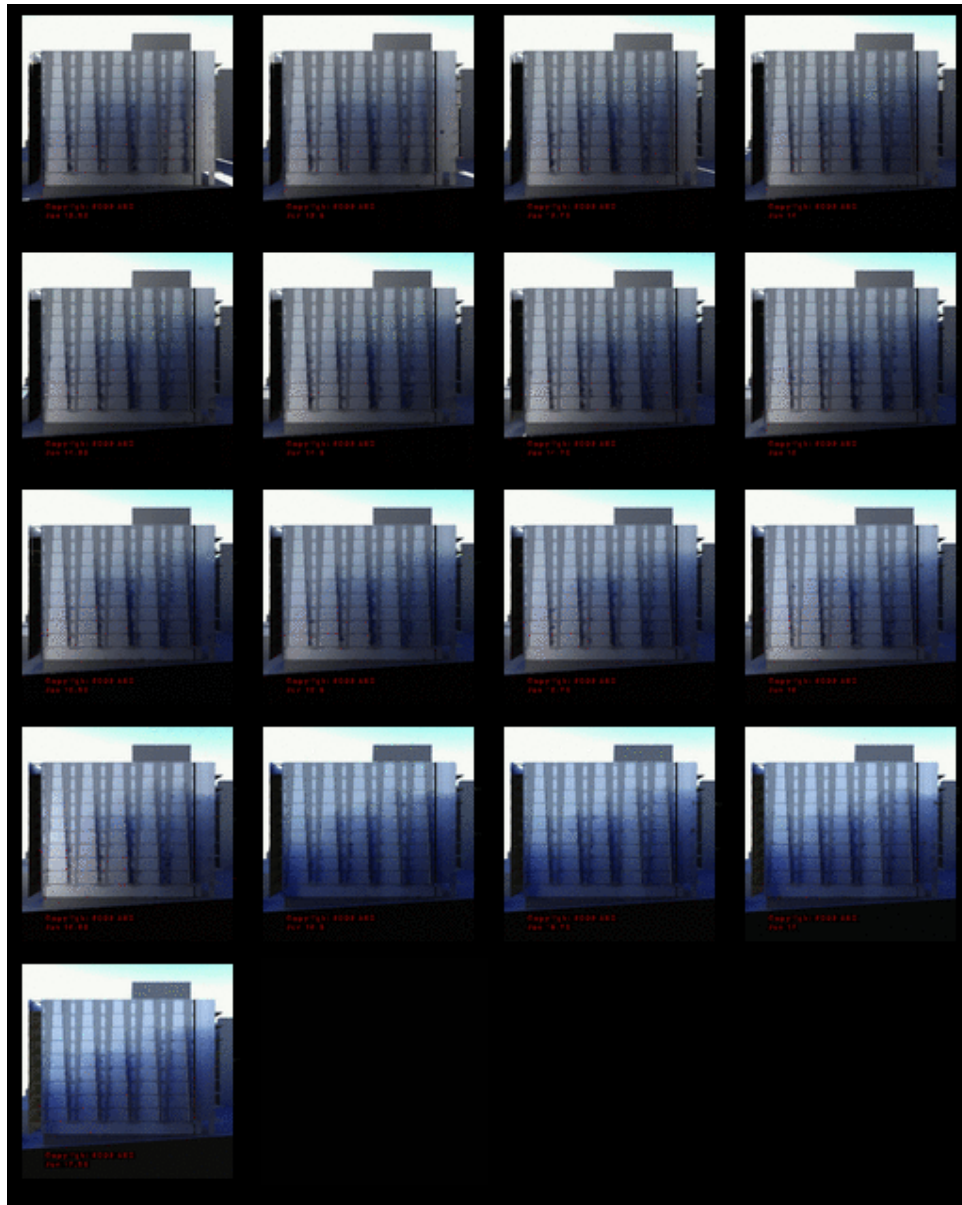


Figure 8 - winter: southern facade 1pm – 5:30pm

Winter: Roof



Figure 9 - winter: roof 7am - 12:45pm

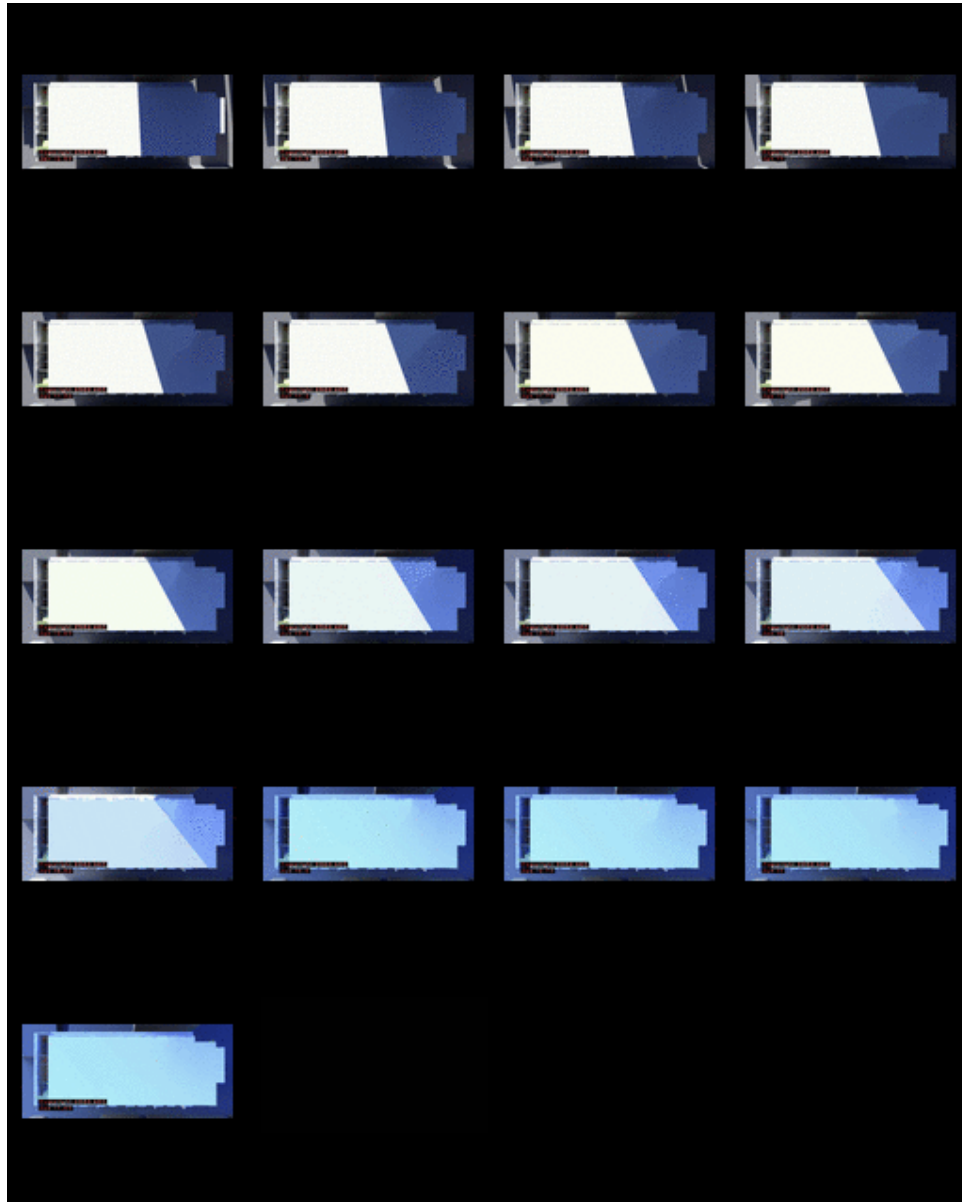


Figure 10 - winter: roof 1pm – 5:30pm

APPENDIX B – SUMMER SHADING

Summer: Eastern Façade

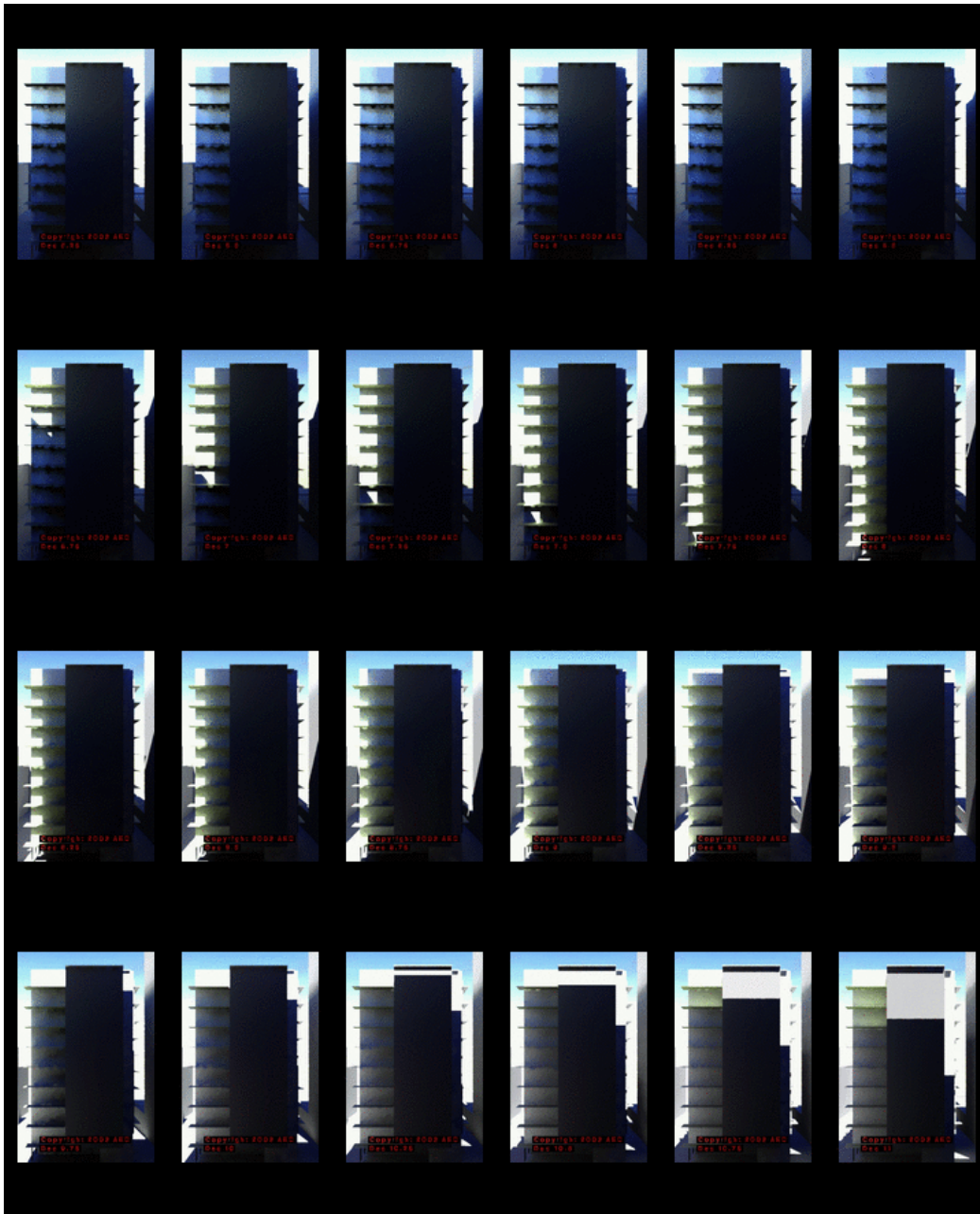


Figure 11 - summer: eastern facade 5:15am – 11am

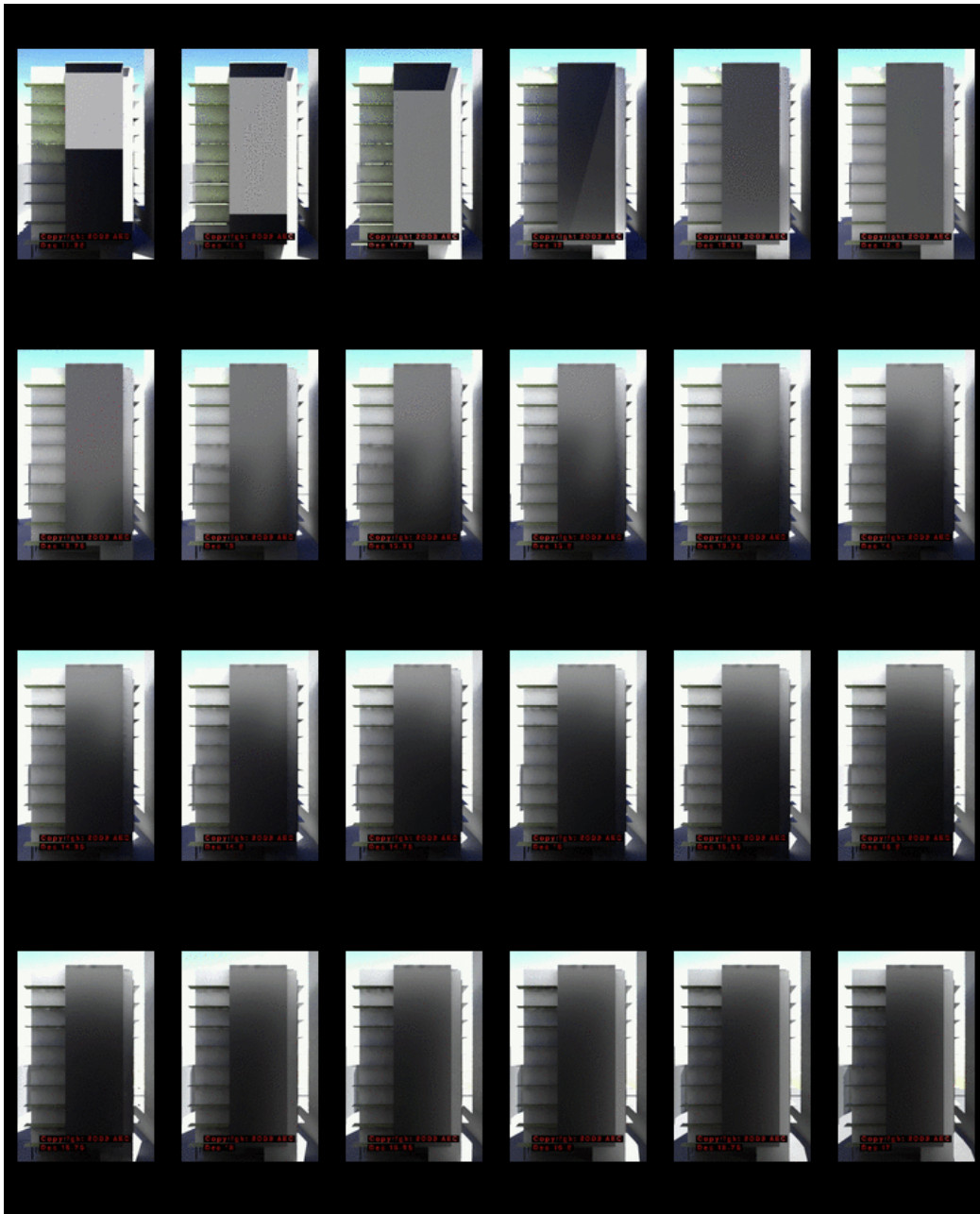


Figure 12 - summer: eastern facade 11:15am – 5pm

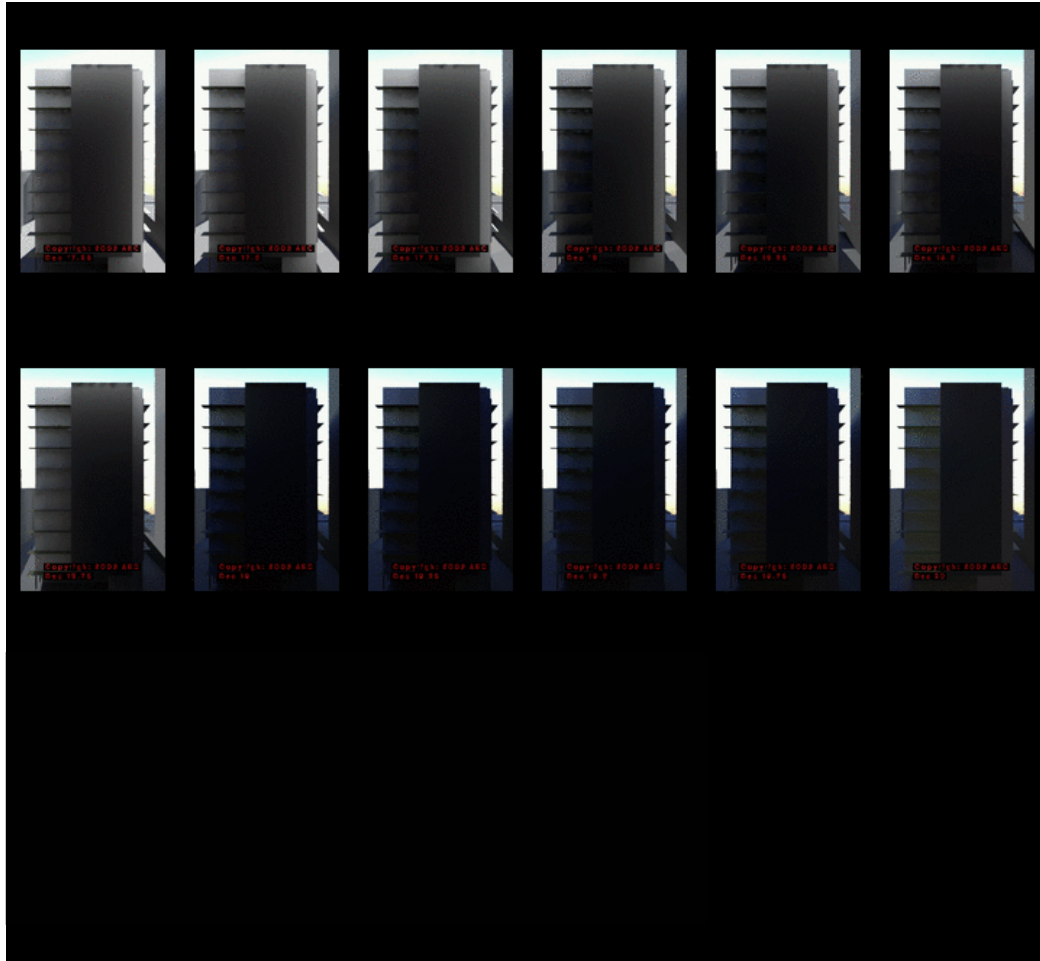


Figure 13 - summer: eastern facade 5:15pm – 9pm

Summer: Western Façade



Figure 14 - summer: western facade 5:15am – 11am



Figure 15 - summer: western facade 11:15am – 5pm

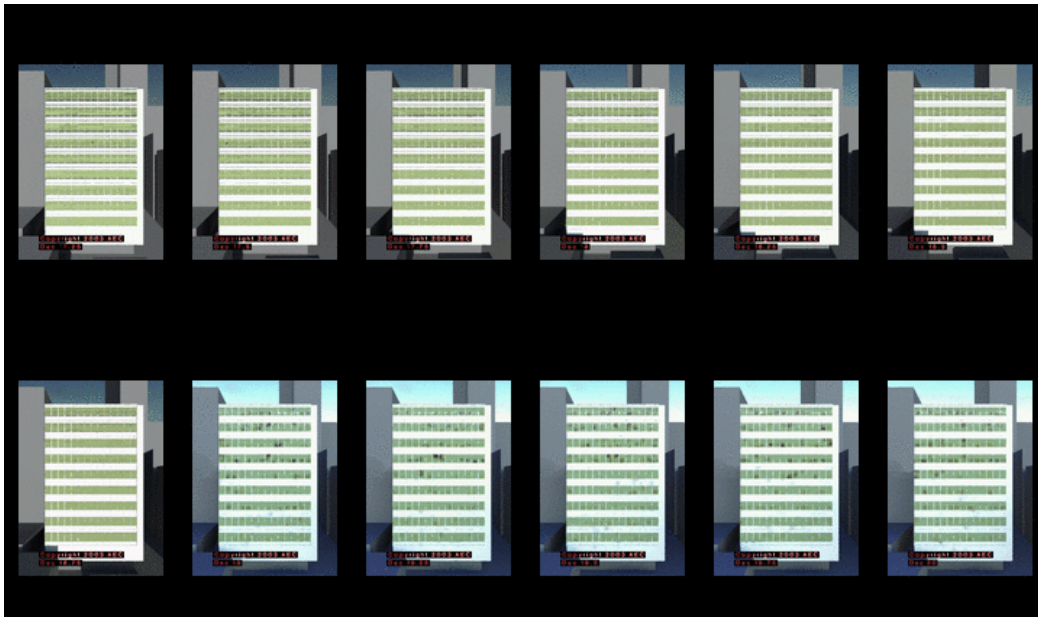


Figure 16 - summer: western facade 5:15pm – 9pm

Summer: Northern Façade

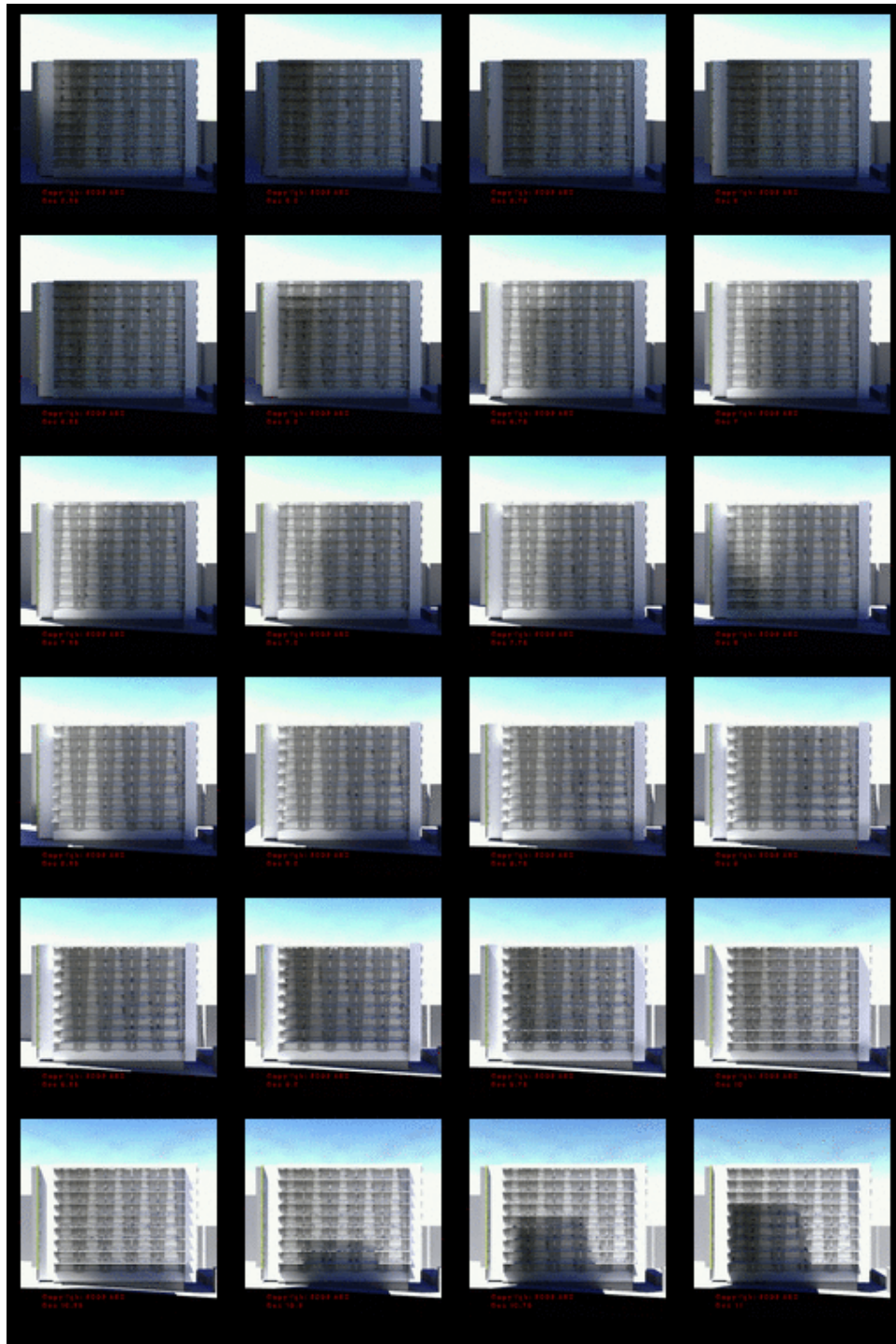


Figure 17 - summer: northern facade 5:15am – 11am

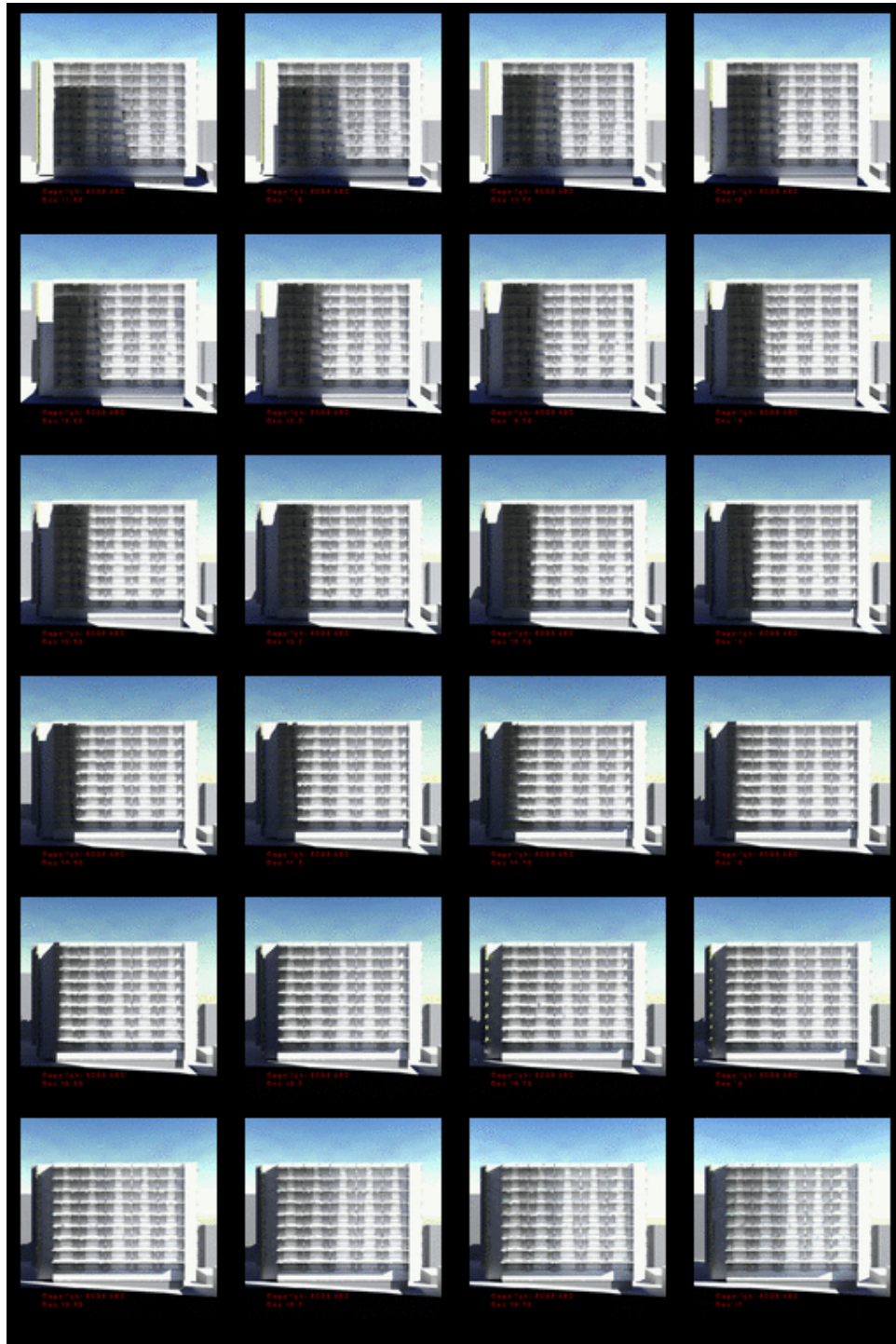


Figure 18 - summer: northern facade 11:15am – 5pm

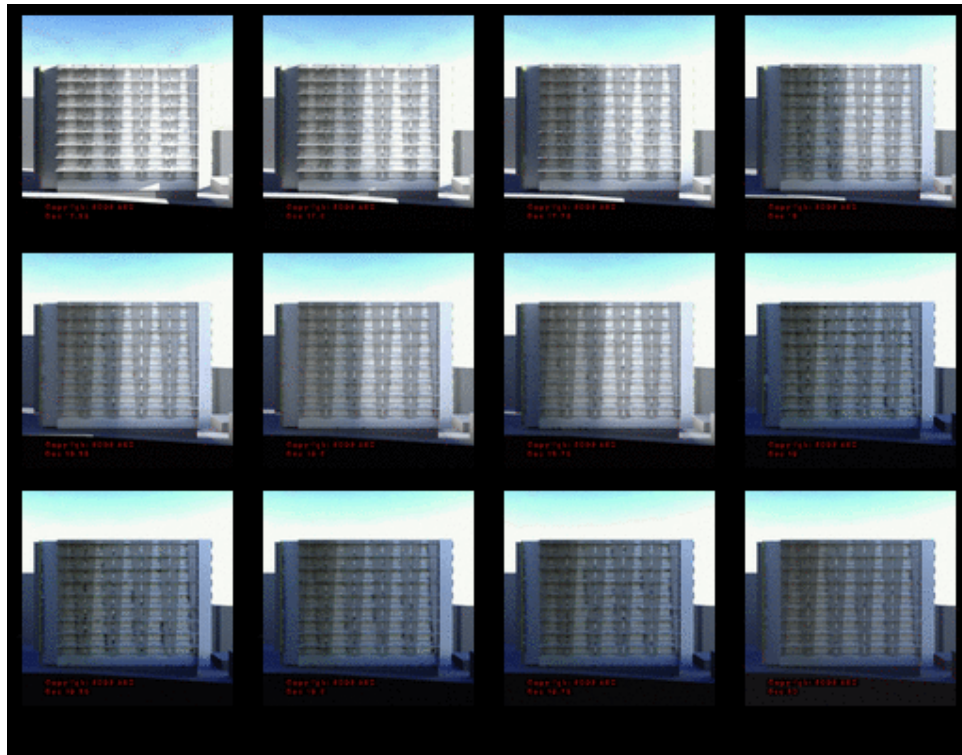


Figure 19 - summer: northern facade 5:15pm – 9pm

Summer: Southern Façade

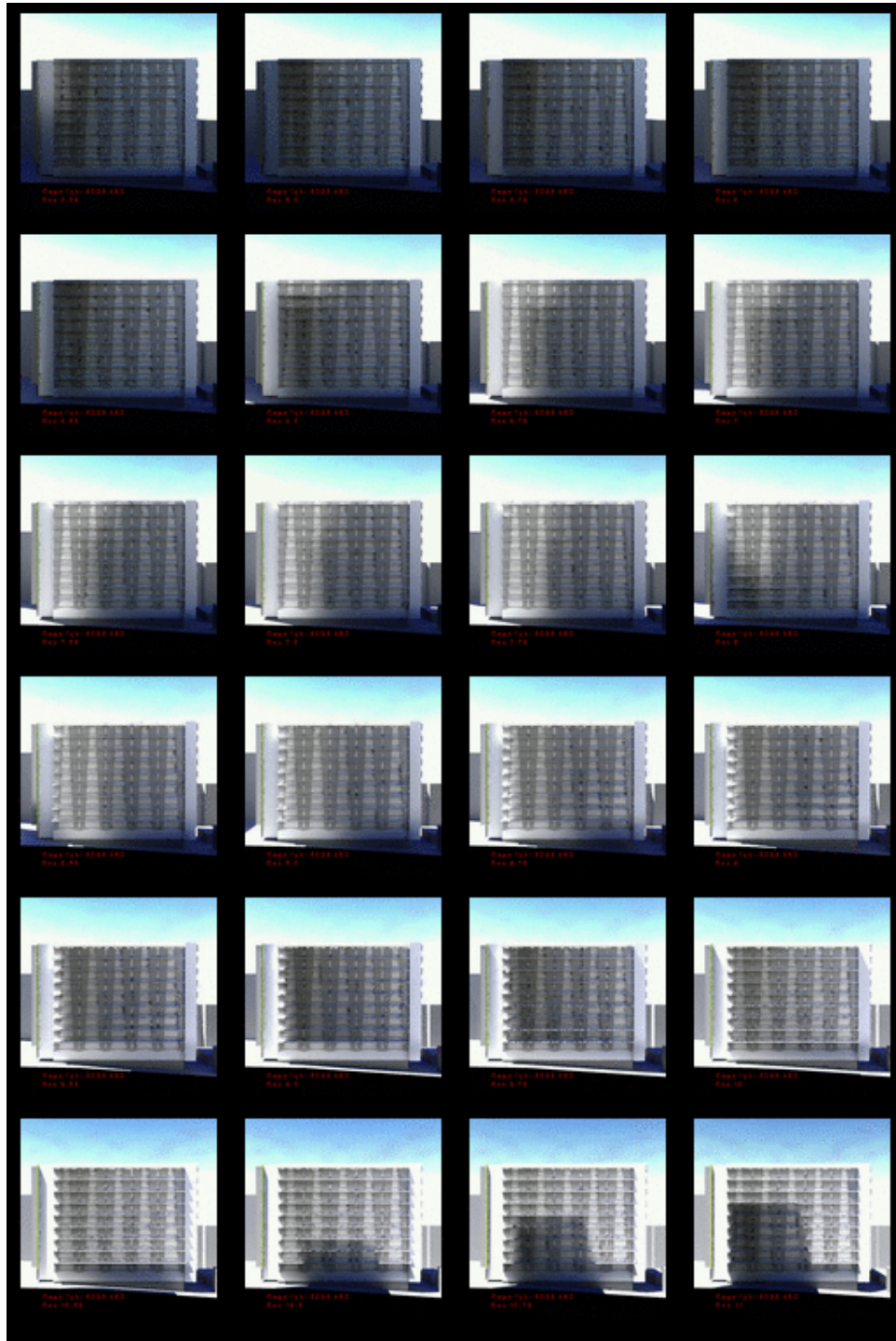


Figure 20 - summer: southern facade 5:15am – 11am

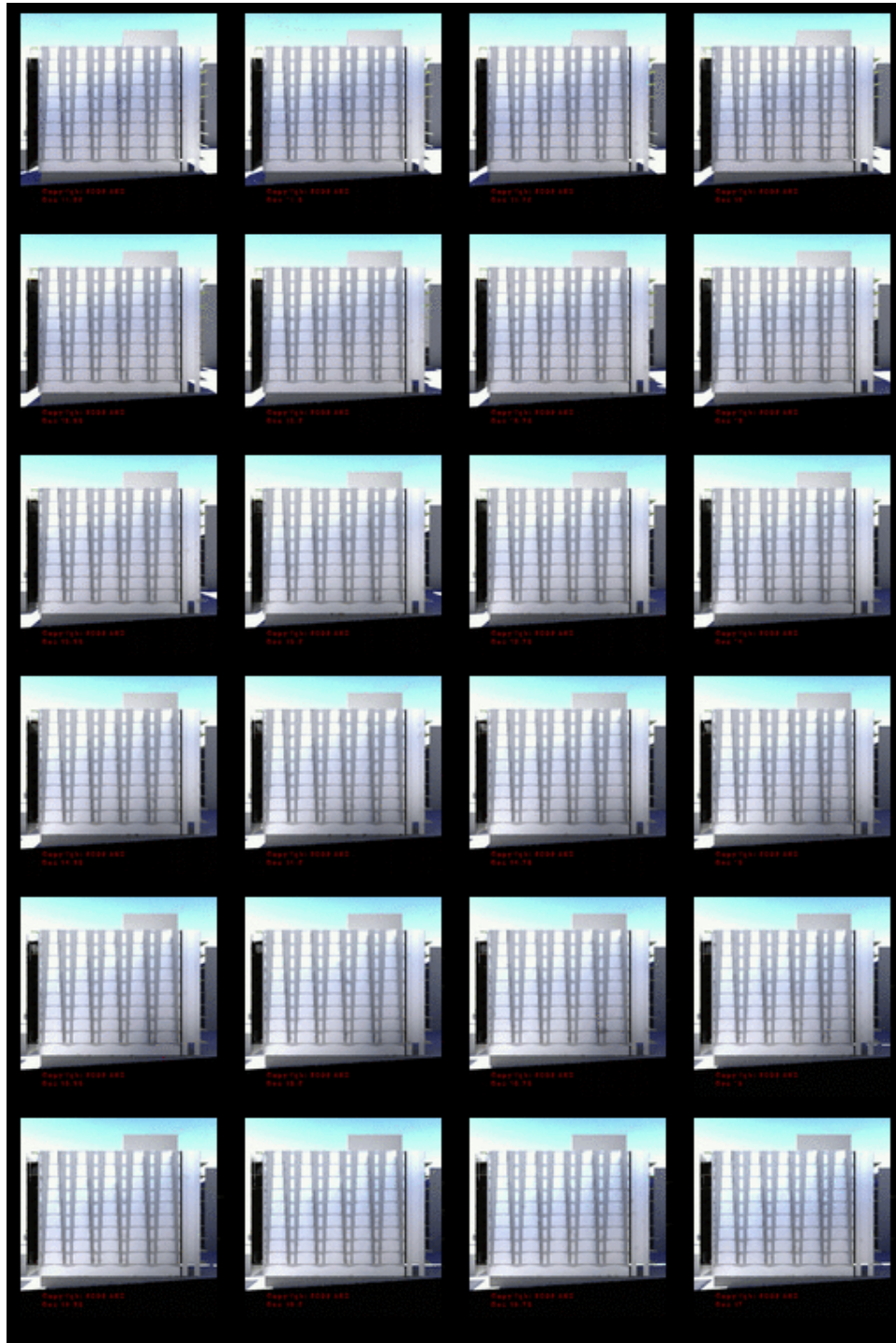


Figure 21 - summer: southern facade 11:15am – 5pm

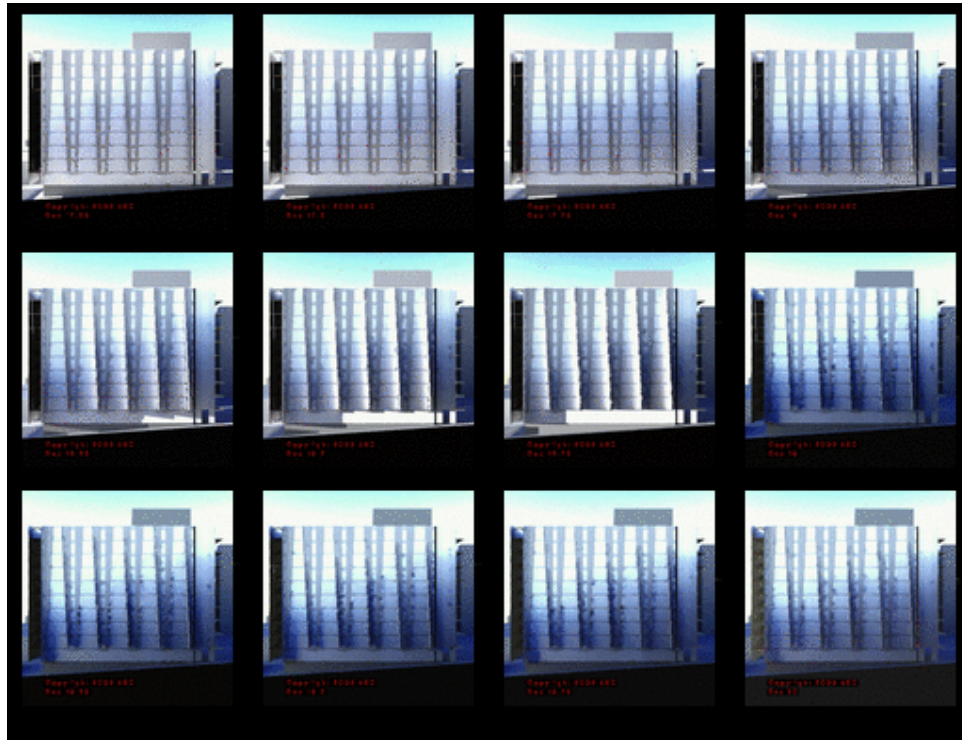


Figure 22 - summer: southern facade 5:15pm – 9pm

Summer: Roof

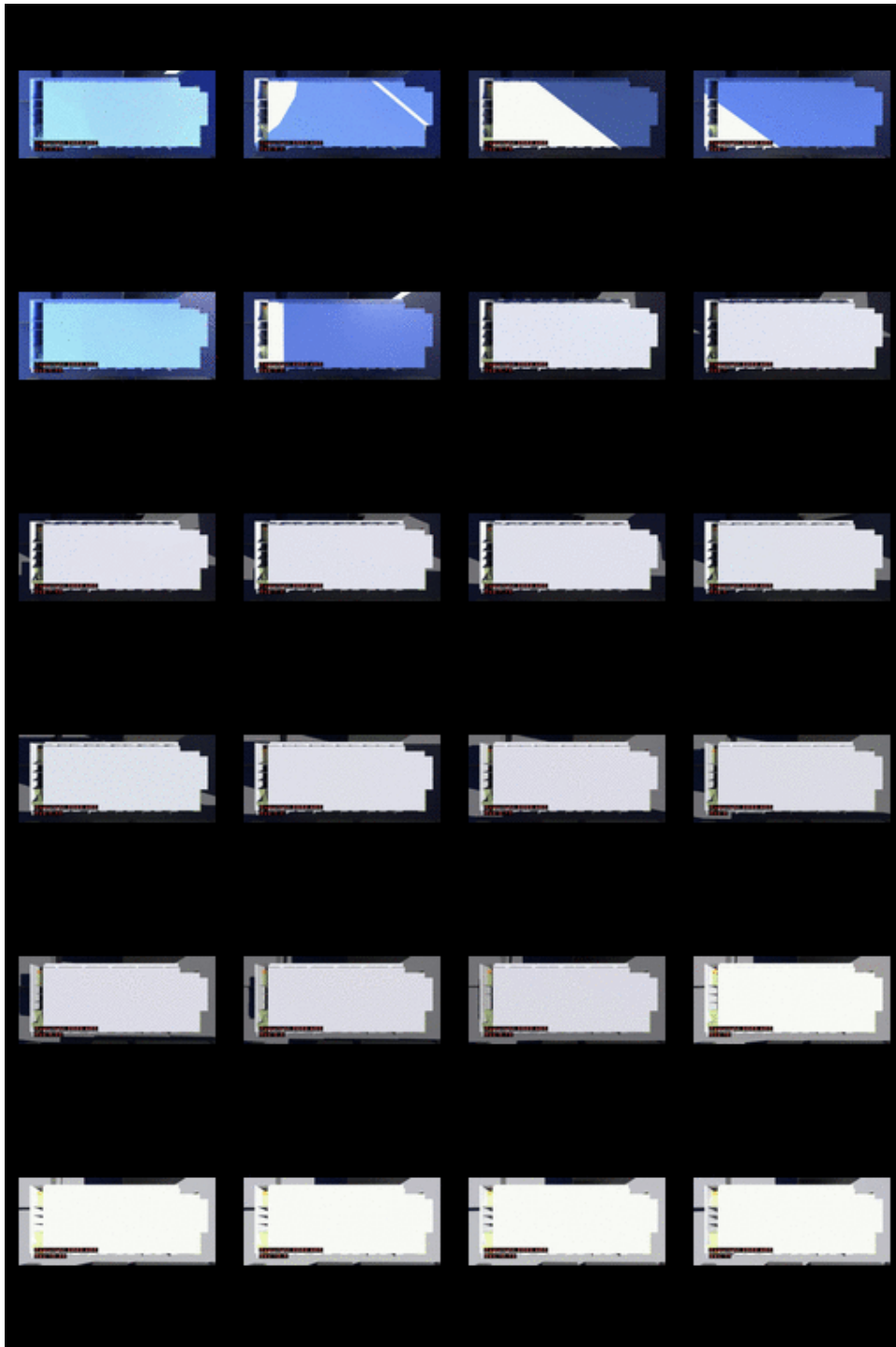


Figure 23 - summer: roof 5:15am – 11am



Figure 24 - summer: roof 11:15am – 5pm

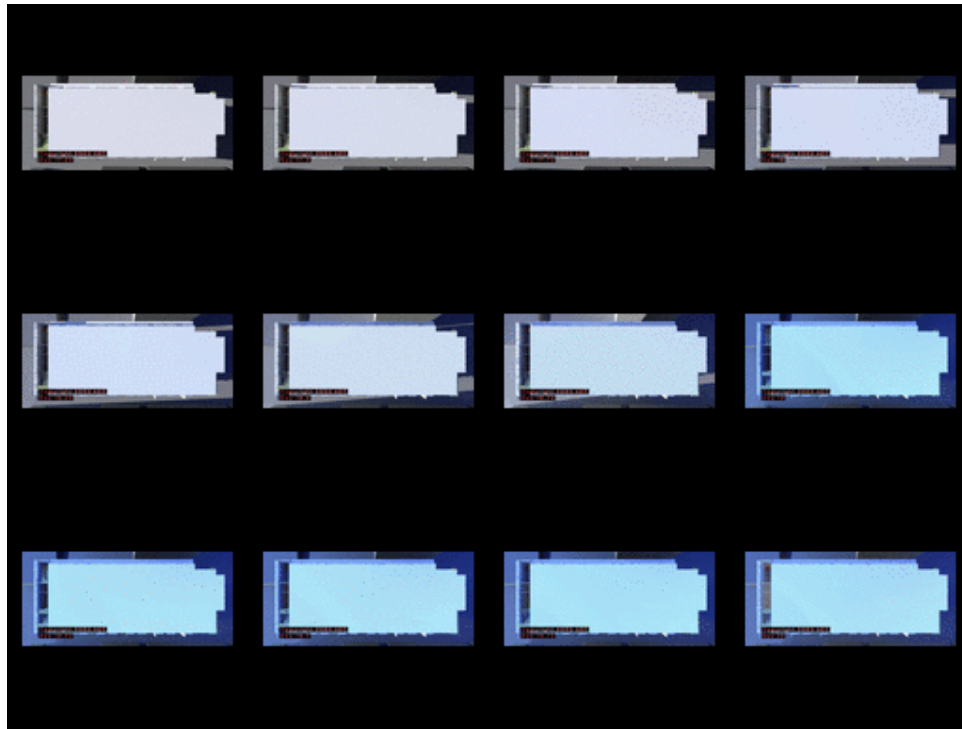


Figure 25 - summer: roof 5:15pm – 9pm

APPENDIX C - SPRING SHADING

Spring: Eastern façade

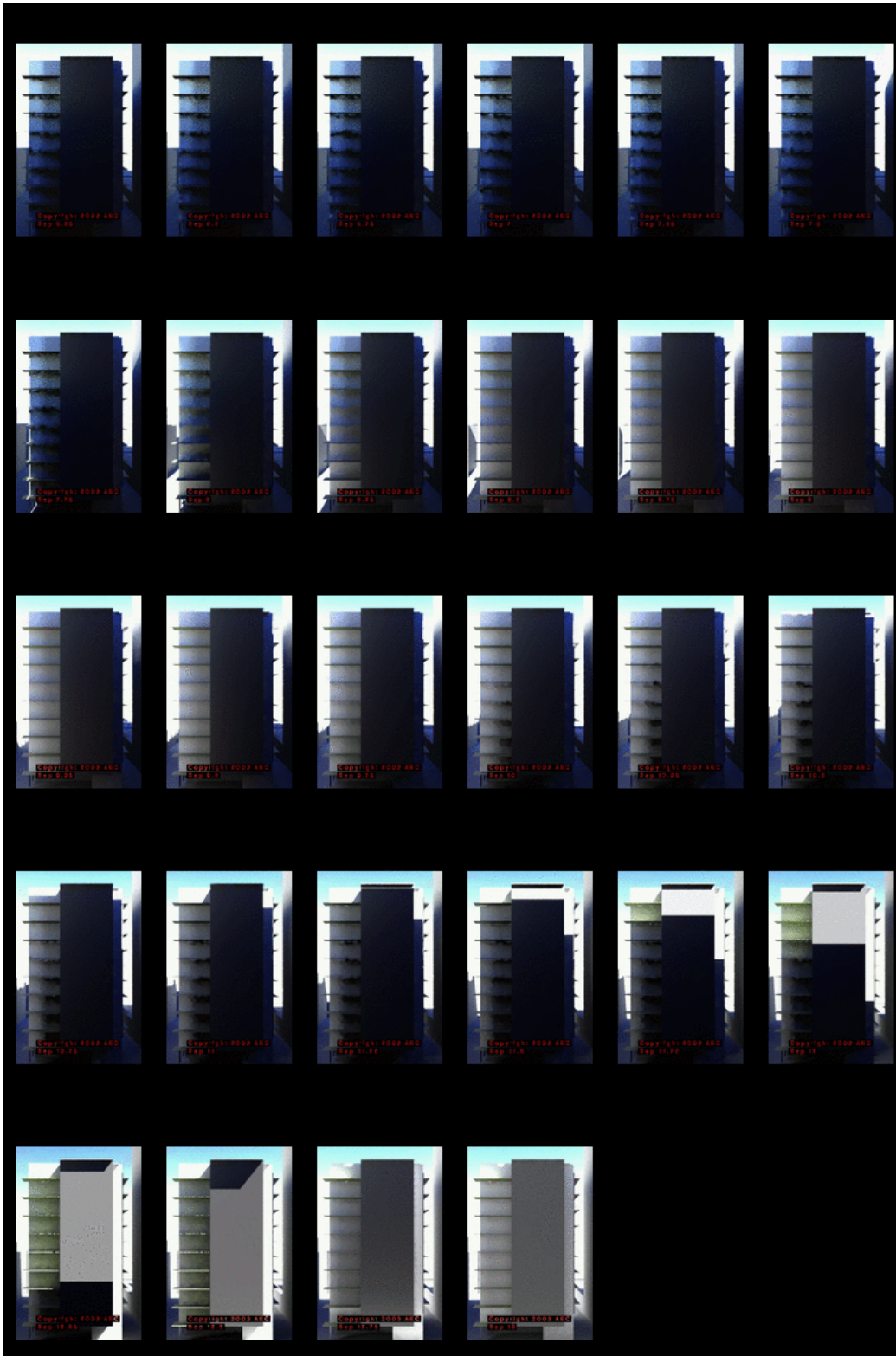


Figure 26 - spring: eastern facade 6:15am – 1pm



Figure 27 - spring: eastern facade 1:15pm – 8pm

Spring: Western Façade

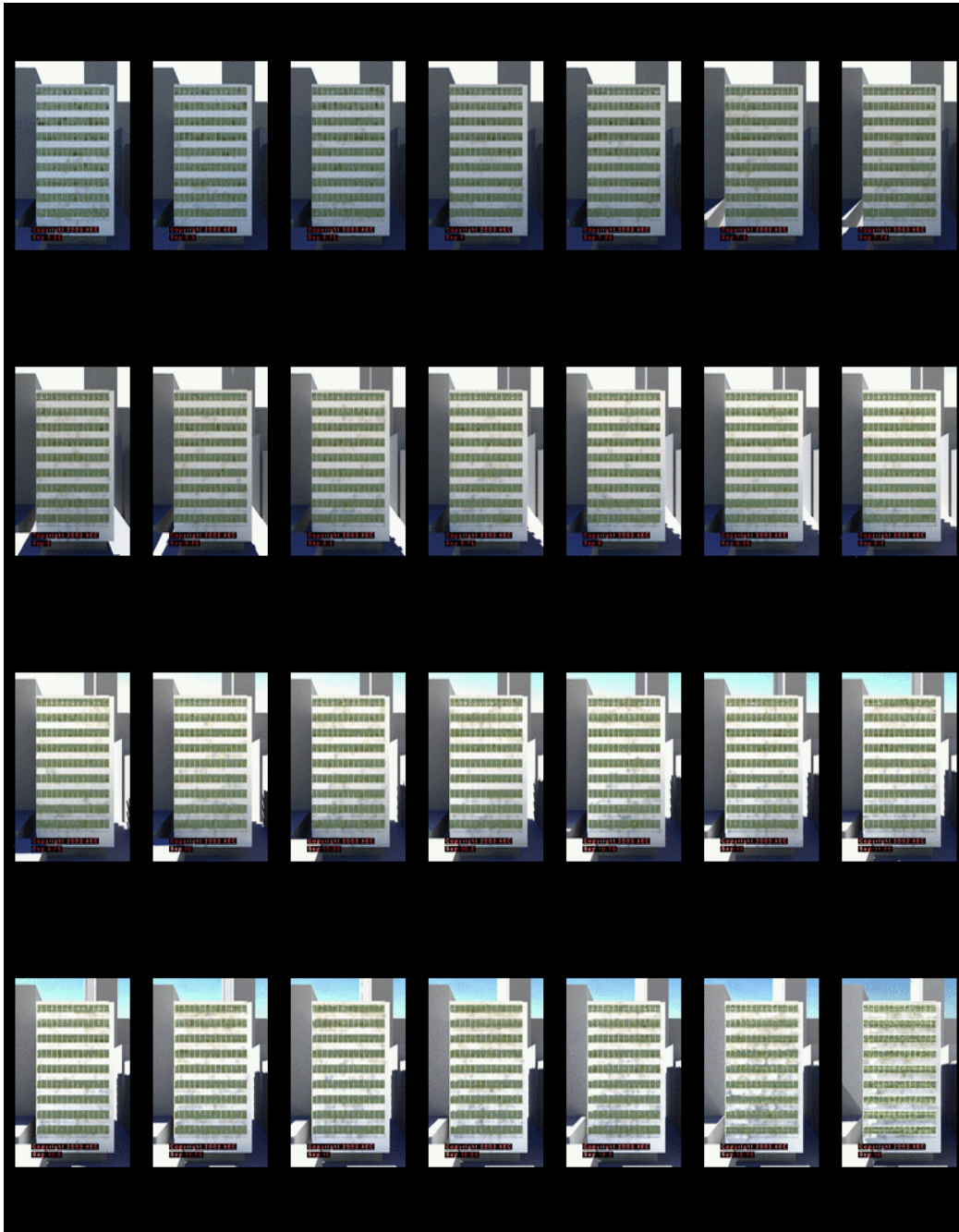


Figure 28 - summer: western facade 5:15am – 11am

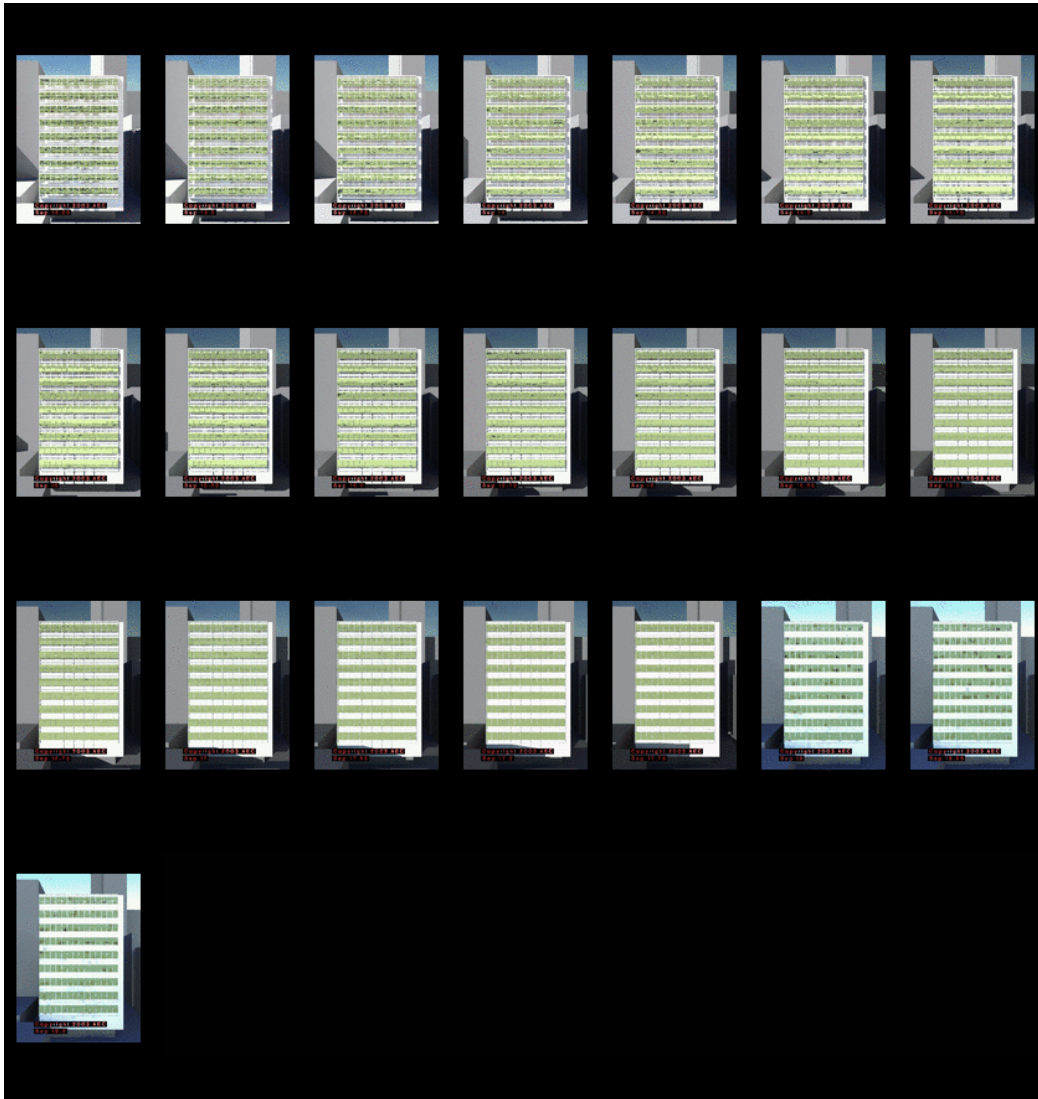


Figure 29 - spring: western facade 1:15pm – 8pm

Spring: Northern Façade



Figure 30 - summer: northern facade 5:15am – 11am



Figure 31 - spring: northern facade 1:15pm – 8pm

Spring: Southern Façade

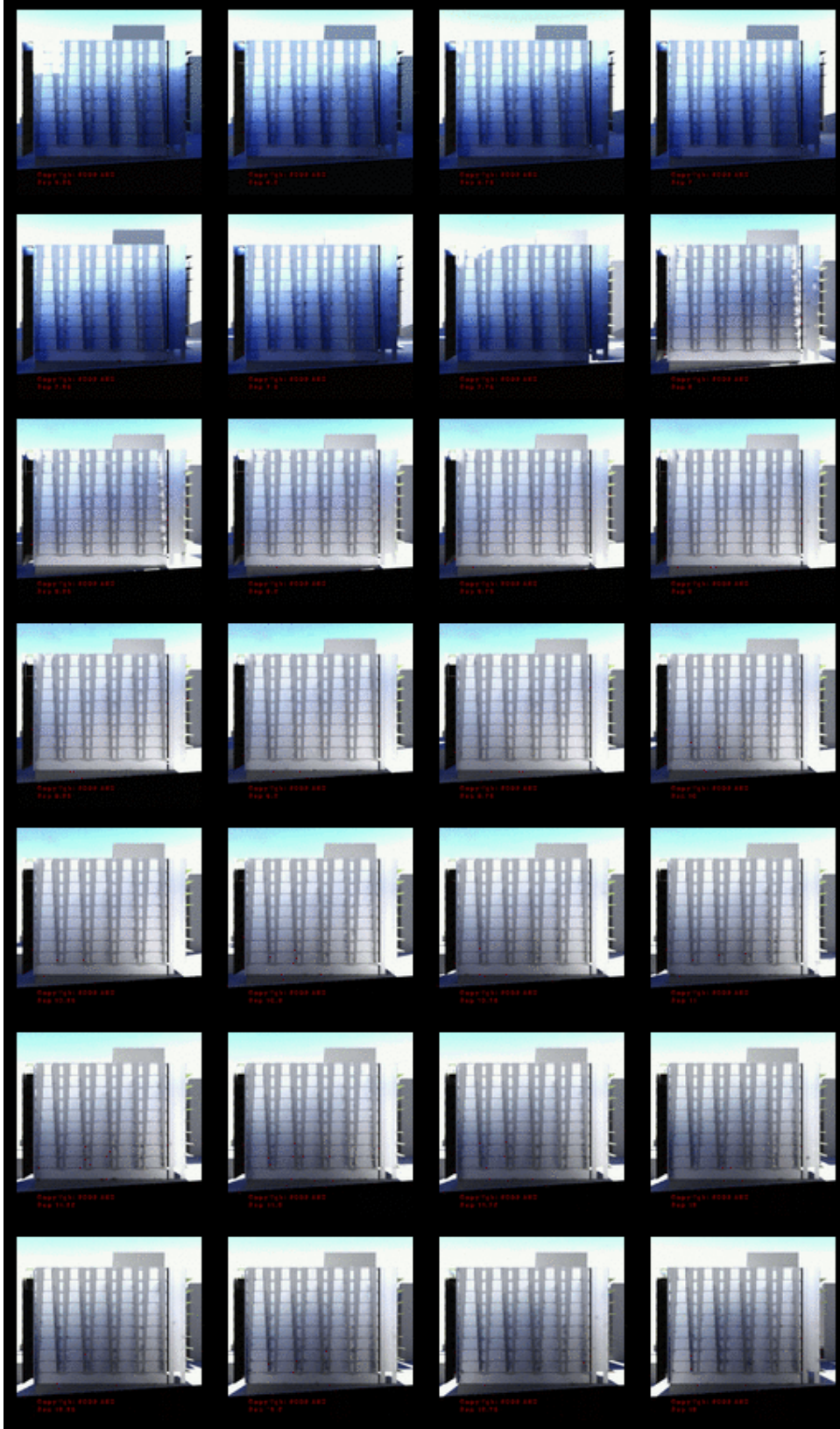


Figure 32 - summer: southern facade 5:15am – 11am

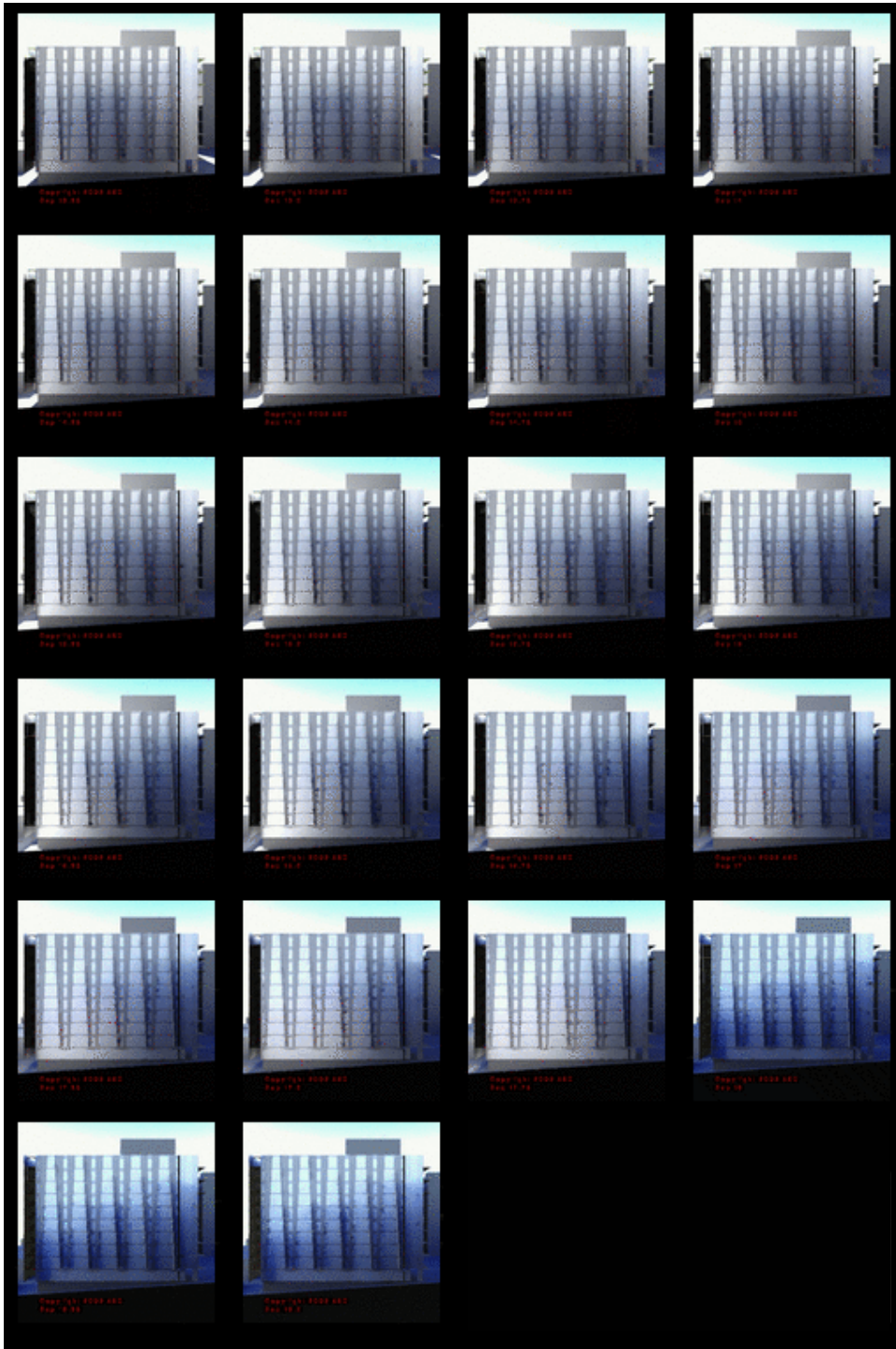


Figure 33 - spring: southern facade 1:15pm – 8pm

Spring: Roof



Figure 34 - summer: roof 5:15am – 11am

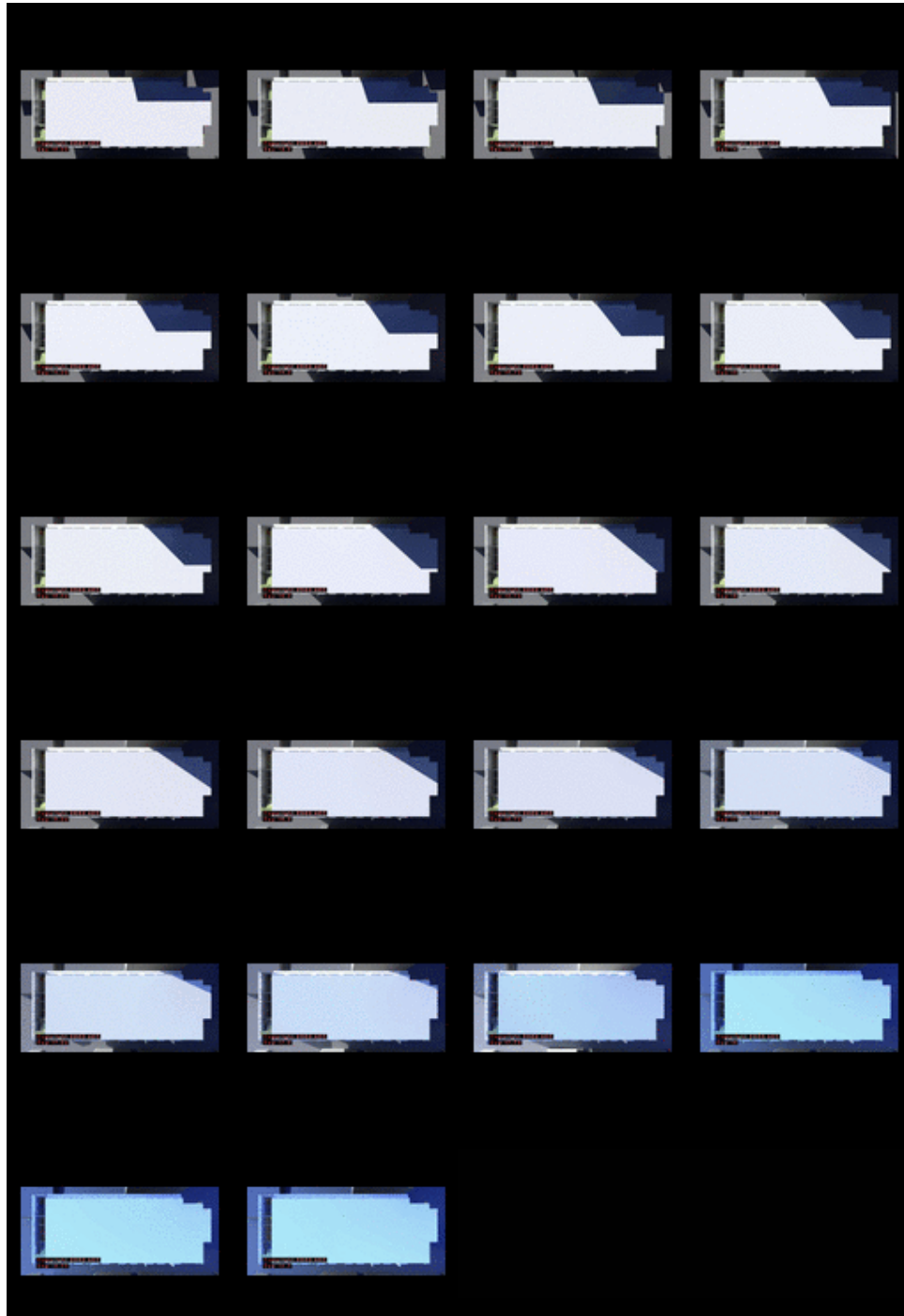


Figure 35 - spring: roof 1:15pm – 8pm